

**Bear Run Mine (Amendment 5)**  
**USACE Section 404 Permit LRL-2011-1117-gjd**  
**Enhanced Supplemental Off-Site Mitigation Plan for Busseron Creek**

**Introduction:**

The Busseron Creek supplemental off-site stream and wetland mitigation will compensate for temporal impacts to wetlands and streams associated with the Bear Run Mine (Amendment 5) Section 404 Permit LRL-2011-1117-gjd. This plan was developed by Peabody Midwest Environmental Services Group in consultation with Jeff Barry, PhD of ARCADIS, who is performing HEC-RAS floodway modeling and providing technical input (see attached ARCADIS memo).

The Busseron Creek mitigation plan fully considers both temporal loss and temporary impacts identified within the Amendment 5 area. The magnitude of stream length and wetland acreage, function and value are commensurate with these impacts and is considered supplemental to the significant size and scope of mitigation that will be established on-site (i.e. the permit area). For comparison, the site impacts and on-site and off-site mitigation are shown below for the proposed supplemental Busseron Creek mitigation plan and for the supplemental Buttermilk Creek mitigation plan that was approved for the previous Bear Run permits (Bear Run East and Bear Run Amendment 4) and an assessment of overall function and value follows. It is important to consider that the value of the Busseron Creek (perennial with an upstream watershed area of 138 square miles) mitigation is significantly greater than the Buttermilk Creek (ephemeral and intermittent with an upstream watershed area of 10 square miles) mitigation due to the size of the watershed (the Busseron Creek mitigation upstream watershed area is more than ten times the Buttermilk Creek mitigation upstream watershed area) and function of the streams, etc. (not necessarily based on stream length and wetland acreage but function and value). Also important is the location in a key wetland wildlife corridor adjacent to the Minnehaha State Fish and Wildlife Area.

	Combined Bear Run East and BR4 Impacts	Combined Bear Run East and BR4 Mitigation	Bear Run (Amendment 5) Impacts	Bear Run (Amendment 5) Mitigation
On-site Streams	249,471 ft	154,010 ft	514,500 ft	385,417 ft
On-site Wetlands	89.06 acres	175.70 acres	157.81 acres	367.63 acres
Off-Site Stream		5,500 ft Buttermilk (intermittent)		22,866 ft Busseron (perennial)
Off-Site Tributaries		14,420 ft Tributaries (intermittent & ephemeral)		
Off-site Wetlands		88 acres		135 acres

As shown by the above information, the proposed Busseron Creek off-site mitigation plan offers proportionately, mitigation that is at least equal in function and value to the

sustainability of wetland, stream and aquatic resources as will the approved Buttermilk Creek off-site mitigation when considering the overall impacts and both on-site and off-site compensatory mitigation. The majority of the Busseron Creek stream mitigation is located in wooded areas and existing riparian buffers will be maintained, replaced or enhanced as required to facilitate stream restoration.

**Location:**

The project site is located 2.2 miles east of Sullivan, in Sullivan County Indiana and is located both north and south of State Route 54. The Busseron Creek restoration is bordered to the north by The Indiana Rail Road Company railroad. The site is located in portions of Sections 1 and 2, Township 7 North, Range 9 West, Sections 35 and 36, Township 8 North, Range 9 West, Section 20, Township 8 North, Range 8W all located within the Sullivan, Dugger, and Hymera 7.5 minute United States Geological Survey (USGS) quadrangles. See attached aerial photo-based map entitled *Bear Run Mine (Amendment 5) Mitigation Map - Map C (Off-Site)*.

**Responsible Parties:**

Applicant	Contact	Property Owner(s)
Peabody Midwest Mining, LLC 7100 Eagle Crest Boulevard Evansville, IN 47715-8152	Bryce West 812-434-8580	American Land Holdings of Indiana, LLC & Uncontrolled Property to be Acquired

**Site Description:**

The Busseron Creek site is situated in the USGS Middle Wabash-Busseron Watershed, 8-digit HUC 05120111. This site is oriented as a cross-section of the Busseron Creek valley encompassing ~14,450 linear feet of the abandoned original oxbow stream channel restoration and ~8,416 linear feet of dredged channel enhancement. The following information was derived by remote sensing, geographic information system (GIS), on-site reconnaissance, sampling and global positioning system (GPS), and conventional based-surveying. Information was also gathered from local neighbors with extensive knowledge of the site and surrounding area.

**1. Land use:**

The project site consists of a main parcel and seven adjacent outlying parcels that will be utilized for wetland development. The main parcel is 433.1 acres. Land use on the main parcel consists of approximately 396.1 acres of wet woods, dredged channel of Busseron Creek, and remnant oxbow features, a segment of State Route 54, and 37 acres of cropland. The four adjacent parcels and three additional parcels located approximately 3.2 miles northeast of the stream restoration adjacent to Busseron Creek have agricultural land uses and consist of the following acreages: Field B (7.0 acres), Field C (36.6 acres), Field D (8.2 acres), Field E (5.5 acres), Field F (3.0 acres), Field G (16.0 acres) and Field H (26.0 acres). Field A is located within the main parcel and consists of 36.7 acres.

## **2. Hydrology:**

Busseron Creek watershed is ~260 square miles and includes portions of Vigo, Clay, Greene, and Sullivan Counties. Busseron Creek originates in the southeast corner of Vigo County, north of State Road 246 and east of Farmersburg, Indiana. The creek flows south/southwest through Sullivan County ~36 miles to its confluence with the Wabash River, near the Sullivan-Knox County line. Historically, the Busseron Creek watershed has been extensively impacted by human activities, primarily from agriculture and mining. Mining ranges from active surface and underground mining to large tracts of both reclaimed and non-reclaimed spoil grounds. Busseron Creek has been channelized and dredged through the years. These efforts are evidenced by Busseron Creek being a deep, straight channel with steep spoil banks through the project site.

The project site is located approximately midway in the Busseron Creek watershed with an upstream drainage area ~138 square miles. Hydrologic inputs to the site include Busseron Creek as well as backwater flooding.

## **3. Soils:**

The majority of the site is developed in hydric soils with the dominate soil series being Atkins (Ak), Patton (Pc), Cuba (Cu), and Stendal (Sn). Stendal makes up the majority of the floodplain with Atkins and Patton along the edges. The Stendal silt loam is found on the bottom lands of streams and likely flood during the winter and early spring. Flooding is a hazard and wetness is a limitation for agriculture. The Atkins silt loam, Cuba silt loam, and Patton silty clay loam are found in depressional areas adjacent to the Busseron Creek floodplain and likely to experience flooding.

## **4. Climate:**

Sullivan County, Indiana exhibits a continental climate influenced by cold polar air from the north and warm air from the south. The average annual rainfall is approximately 39 inches. Average annual runoff is approximately 12 inches. Precipitation is generally greatest in the late spring and early summer with an average cumulative precipitation slightly over 4 inches per month. During the fall and winter seasons the average cumulative precipitation is less than 3 inches per month. The 24-hour precipitation event for the area ranges from 2.7 inches for a one year frequency event to 5.1 inches for a 25-year frequency. Two-hour rainfall intensity ranges from 1.5 inches for a one-year frequency to 2.9 inches for a 25-year frequency. In general, the highest mean monthly stream flows in southern Indiana occur from March through May when spring rains occur; the highest peak flows are typically in July because of thunderstorm activity.

The mean annual surface air temperature is approximately 53°F. July is usually the warmest month (~77°F) and January is usually the coldest (~31°F). Evapotranspiration is estimated to average approximately 27 inches annually. Maximum evapotranspiration typically occurs during June or July and the minimum is during December or January. Prevailing winds are typically from the southwest with an average velocity of 10 mph in the spring and 7 mph in late summer, except during the winter when they are westerly and northwesterly.

## 5. Aquatic Resource Functions:

The aquatic resources functions considered in this mitigation include water quality, sediment transport, habitat, and nutrient cycling. Nutrient cycling, as a component of water quality can also be extrapolated from that report.

## 6. Timing:

Mitigation on this site will be established before the vast majority of impacts occur associated with the Bear Run Mine (Amendment 5) surface mining area which greatly offsets temporal loss. The likelihood of success on this site is high. Mitigation will be completed by the end of the 2<sup>nd</sup> full growing season following permit issuance.

### Mitigation Objectives and Approach:

The purpose of this section is to describe the general strategies that will be applied to the various site conditions and landuses. Total mitigation generated on this site includes ~14,450 linear feet of the abandoned original oxbow stream channel restoration and ~8,416 linear feet of dredged channel enhancement, 135.0 acres of forested wetland creation, and 4.0 acres of upland forest creation. The objective is to produce a high level of stream and wetland function, with a high degree of stream and wetland interaction. The stream mitigation will pass the majority of upstream flow (approximately 3/4 to 2/3) through the restored remnant oxbow channel and the remainder of flow (approximately 1/4 to 1/3) through the existing dredged channel. The exact flow ratios will be determined with US Army Corps of Engineers Hydrologic Engineering Centers River Analysis System (HEC- RAS) modeling of the composite flow regime. This restoration approach maximizes the development of aquatic ecosystem area and function by orienting the individual hydrologic components - streams and wetlands in a manner conducive to landscape connectivity and complimentary function. Because the floodplain is prior converted cropland it is expected to develop strong wetland characteristics. With maturity, the stream and wetland together will function more as a flowing aquatic ecosystem. Aside from being large and contiguous, many physical, chemical, and biological aquatic ecosystem functions are enhanced by this design as the stream and wetland each provide their unique benefits simultaneously and complimentary.

### 1. Stream Mitigation:

Restoration of 22,866 linear feet of Busseron Creek will consist of the reactivation of 14,450 linear feet of the original stream oxbow adjacent to the existing channel and establishing a channel within a channel for low flow through 8,416 linear feet of the currently active dredged channel. Reactivation will occur by reconnecting the watershed to the meandering oxbow channel by clearly defining the oxbow channel through minor excavation work and incorporating a minimum of one earthen and rock plug into the channelized portion of Busseron Creek to direct flow into the meandering channel. A typical earthen and rock plug detail is attached to this mitigation plan in the exhibit entitled *Plug Detail*. Flow will be split at the plug directing the majority to the restored remnant oxbow channel and the remainder through the dredged channel. The flow proportions will approximate ratios of approximately 3/4 to 2/3 through the restored remnant oxbow channel and approximately 1/4 to 1/3 through the existing dredged

channel. The exact flow ratios will be determined with US Army Corps of Engineers Hydrologic Engineering Centers River Analysis System (HEC-RAS) modeling of the composite flow regime. This allocation of flow regime will establish the primary flow through the high value natural channel and provide flood routing through the dredged channel during high flow and a base flow component during low flow. The use of both channel sections will maximize aquatic habitat, function and value.

The restored Busseron Creek will follow the magenta line shown on Map C, utilizing the existing State Route 54 Bridge, to its connection back into the existing channel south of Highway 54. The additional and redirected flow will provide a considerable increase in stream function at the mitigation site. It will also increase wetland hydrology across the floodplain, but not to an extent detrimental to the existing forest. Since abandonment of the oxbow, some limited areas of saplings and brush have grown up within the channel and will be removed when the channel is reshaped to natural channel dimensions.

Details are provided later in the Stream Mitigation Plan.

## 2. Wetland Mitigation:

Wetland mitigation consists of creating 135.0 acres of palustrine forested (PFO) wetlands on existing cropland. The plan proposes to create wetland habitat on five fields at the site. The following table lists the fields along with associated acreage of wetland and upland forest buffer creation.

Wetland Area	PFO Wetland Acreage	Upland Forest Buffer Acreage
Field A	36.7	
Field B	7.0	
Field C	32.6	4.0
Field D	8.2	
Field E	5.5	
Field F	3.0	
Field G	16.0	
Total	135.0	4.0

In addition, 4.0 acres of upland forest buffer will be created adjacent to one wetland area to provide protection to the proposed wetland creation area. A limited amount of excavation will be conducted to remove diversions and fill in old ditches. No soil will be exported from the site. Hard mast-producing species will be planted utilizing bare root trees as specified in the Bear Run Mine (Amendment 5) Section 404 permit application. These wetland mitigation sites will improve downstream water quality by eliminating sediment runoff from agriculture fields, increase continuity and connectivity of the surrounding forested habitats, improve the quality of vegetation by selectively planting

hard mast species, filter out any pollution from pre-law mining areas, and provide flood relief.

Details are provided later in the Wetland Mitigation Plan.

**Mitigation Compensation and Timing:**

Wetland Creation		Stream Restoration		Upland Forest Creation	
PFO Wetland Creation	135.0 acres	Busseron Creek Restoration	22,866 linear feet	Upland Forest Buffer Creation	4.0 acres
Restoration, plantings, etc. will be completed by the end of the 2 <sup>nd</sup> full growing season following permit issuance.					

**Construction:**

- a) Construction will be completed under suitable field conditions. Excavation during excessively wet or dry conditions reduces the quality of the end product and increases the risk of failure. In extreme circumstances (such as record wet or dry growing seasons), construction may have to be postponed until the following year. Operating heavy equipment in ecologically sensitive areas requires knowledge of heavy equipment operation, soil stratification, plant identification, and strict attention to detail. Well-trained personnel will be onsite during all phases of construction to ensure restoration objectives are met with minimum disturbance. Equipment used may include dozers, skidders, pumps, track hoes, backhoes, scrapers, pans, trucks, or payloaders. Note that there will be minimal tree clearing for equipment access along and adjacent to the stream banks.
- b) Soil conditioning is necessary to reduce compaction, remove weeds, incorporate soil amendments, and prepare a seedbed conducive to good seed to soil contact.
- c) Planting is the most expensive and failure-prone step in restoration. Site-specific conditions of microtopography and hydroperiod will guide the final planting and management process. All plant materials will be maintained in proper conditions such as refrigeration, stratification, dormant, wet, or dry as appropriate until planted. Planting will occur during optimum field conditions and in a manner suitable for establishment of the specific propagule type.

### Challenges:

Challenges anticipated for mitigation success on this site are generally limited to excessively wet conditions and fertility and tilth of the growing substrate relevant to vegetation establishment and survival:

- a) Fertility: Deep tillage will promote water storage in the upper soil profile. Soil amendments including lime and fertilizer will be applied as necessary to create a suitable growing environment for the target species.
- b) Non-Target Species (invasive, exotic or volunteer) invasion and control should be limited as the planting sites are currently being farmed. Problems with the establishment of undesirable plant species in forested areas will typically be controlled with herbicide sprayed on the rows and mechanically removed between rows. Methods to control undesirable species include but are not limited to mechanical removal by logging, chopping, chipping, bush hogging, cutting, girdling, grinding, burning, herbicide, flooding, and desiccation. Beneficial volunteer species may be maintained on site with approval from the U.S. Army Corps of Engineers (USACE).
- c) Hydrology is expected to be very sufficient and periodically excessive. Head and backwater flooding, ponding, and high water tables may sometimes delay certain activities while simultaneously promote vigorous establishment of target species. Temporary diversions may be used. Generally however, no problems are anticipated with establishing or maintaining hydrology.
- d) Erosion in the newly constructed Busseron Creek will be ameliorated by maintaining low slopes via surface shaping in increased channel sinuosity. Erosion control blankets, hydromulch, and mats may be used in conjunction with other bio-engineering methods such as planting live willow stakes. Timely establishment of vegetation will provide long-term stability.

### Contingency Plan:

Actions in Contingency are similar to those previously detailed in the Construction and Challenges sections. If other success criteria are not met for all or any portions of the compensatory mitigation project in any year, and/or if the success criteria are not satisfied, the permittee will prepare an analysis of the cause(s) of failure and propose remedial action for pre-approval. Ecologically this site is completely suited for establishment of the proposed mitigation. Should issues occur that compromise long-term success, the applicant will report to the USACE and based on available information revise the mitigation plan to facilitate successful conditions.

Monitoring, success criteria, long-term management, and protection will be the same as those set forth in Bear Run Mine (Amendment 5) Section 404 permit application.

## Stream Mitigation Plan

### Reference:

This process is derived from a scientific approach to natural channel design. All design parameters are based on optimum reference conditions throughout the region. Channel sizing is based on the watershed area of the stream. The cross-sectional area at bankfull, bankfull width, and bankfull mean depth are derived from regional curve data.

### Busseron Creek Restoration Design Specifications:

#### 1. Goal:

Restoration of 22,866 linear feet of Busseron Creek will consist of the reactivation of 14,450 linear feet of the original stream oxbow adjacent to the existing channel and establishing a channel within a channel for low flow through 8,416 linear feet of the currently active dredged channel. Reactivation will occur by reconnecting the watershed to the meandering oxbow channel by clearly defining the oxbow channel through minor excavation work and incorporating a minimum of one earthen and rock plug into the channelized portion of Busseron Creek to direct flow into the meandering channel. A typical earthen and rock plug detail is attached to this mitigation plan in the exhibit entitled *Plug Detail*. Flow will be split at the plug directing the majority to the restored remnant oxbow channel and the remainder through the dredged channel. The flow proportions will approximate ratios of approximately 3/4 to 2/3 through the restored remnant oxbow channel and approximately 1/4 to 1/3 through the existing dredged channel. The exact flow ratios will be determined with US Army Corps of Engineers Hydrologic Engineering Centers River Analysis System (HEC- RAS) modeling of the composite flow regime. This allocation of flow regime will establish the primary flow through the high value natural channel and provide flood routing through the dredged channel during high flow and a base flow component during low flow. The use of both channel sections will maximize aquatic habitat, function and value.

The restored Busseron Creek will follow the magenta line shown on Map C, utilizing the existing State Route 54 Bridge, to its connection back into the existing channel south of Highway 54. The additional and redirected flow will provide a considerable increase in stream function at the mitigation site. It will also increase wetland hydrology across the floodplain, but not to an extent detrimental to the existing forest. Since abandonment of the oxbow, some limited areas of saplings and brush have grown up within the channel and will be removed when the channel is reshaped to natural channel dimensions. Any drainage to the west of the channelized portion of Busseron Creek will be maintained to the existing channel. The redirected flow will provide a considerable increase in stream function within the mitigation site by allowing more interaction with the forested floodplain and increasing flood storage capacity during periods of high flow. Since abandonment of the oxbow channel, some limited areas of saplings and brush have grown up that should be removed.



## 2. Materials:

Topsoil, rock, and coarse woody debris (trees and root wads) will be logistically placed on-site for construction. Filter fabric, seed, mulch, erosion blanket, pins, and rebar are also necessary. Channel construction will be timed to ensure that channel excavation/construction will occur such that large amounts of disturbance will not occur prior to the mitigation being able to be completed in a reasonable timeframe.

## 3. Channel Construction:

Channel construction will be performed to reshape the original meandering oxbow to natural design stream dimensions. To improve the original meandering channel morphology, some small trees and areas of excessive sediment deposition will be removed to reshape the channel to natural channel dimensions. The basic channel will be constructed with a set width and depth that increases as the stream moves down valley. It is recommended that construction be conducted to make a precise cut with minimal peripheral disturbance.

The proposed channel design within the reactivated oxbow is based on regional curves generated locally by Stantec (2010), which is based on 10 United States Geological Survey (USGS) gage sites across southern Indiana. For a 138-square mile watershed, the expected bankfull discharge, bankfull width, bankfull mean depth, and bankfull and inner berm cross-sectional areas are provided below:

Busseron Creek Dimensions	Regional Curve Results
Bankfull Discharge (cfs)	~1,600
Bankfull Width (ft)	~80
Bankfull Mean Depth (ft)	~7
Bankfull Cross-Sectional Area (square ft)	~550
Inner Berm Cross-Sectional Area (square ft)	~300

These dimensions may be adjusted when the flow division modeling is completed. Because the proposed restoration activities return a portion of Busseron Creek to its historic channel prior to channelization, the plan form, i.e. sinuosity, was not a design parameter. Excavation of the channel will be required where the bottom elevations and channel configuration do not meet regional curve design specifications (see attached *Proposed Cross-Sections of Restored Busseron Creek*). Refer to the attached *Proposed Plan and Profile of Restored Busseron Creek* for the proposed channel centerline and general locations of restored pools and riffles within the reactivated oxbow channel. The approximate longitudinal profile of both the channel thalweg and approximate water surface elevation during a bankfull flow event are also shown on this attachment. The water surface profile was calculated using the US Army Corps of Engineers HEC-RAS hydraulic model.

The following design parameters describe the typical riffle and pool sections within the reactivated oxbow channel. These features will be constructed during the removal of in-channel vegetation and areas of excessive sediment to achieve the desired channel slope and natural channel dimensions. During construction all attempts will be made to minimize disturbance of existing riparian vegetation.

#### **4. Busseron Creek Restoration Design Parameters:**

##### *Riffle Cross-Section:*

Width/depth (W/D) ratio: varies, ~10 to 15

Channel side slope: ~2:1

Bankfull (top) width: varies, ~70 to 90 feet

Mean bankfull depth: varies, ~5 to 10 feet

Maximum bankfull depth: ~10 feet

Bottom width: varies, ~25 to 40 feet

##### *Pool Cross-Section:*

Point bar slope: 8:1

Pool depth: varies, ~10 to 20 feet (maximum depth)

Pool bottom width: same as riffle bottom width

Pool top width: varies, ~70 to 100 feet

#### **5. Pool Construction:**

Pools are deeper than the riffle sections of the stream. Excess material should be dispersed in adjacent floodplain and graded flat in a manner that will not restrict floodplain access.

#### **6. Riffle Structures:**

Riffles serve the main function of grade control and are designed for sustainable scouring during high velocity flows. The riffles will increase substrate diversity as well as providing habitat for invertebrates and fish. Surface turbulence is also increased, enhancing dissolved oxygen levels below the riffle.

#### **7. Coarse Woody Debris:**

Coarse woody debris will be installed in the form of log vanes leading into meander bends and root wad revetments around the meander bends. Root wads and log vanes increase pool development for habitat as well as diversity complexity along the stream channel by varying current speed among the structures providing in-stream and overhead cover for fish as well as ideal substrates for macroinvertebrates. The log vanes decrease near bank stress by deflecting the stream flow energy back towards the center of the stream. Typical details of the structures are shown in Appendix F (*Channel Stability/Habitat Improvement Measures*) of the Bear Run Mine (Amendment 5) Section 404 permit application.

#### 8. Planting and Erosion Control:

- a) Apply lime, fertilizer, and seed to exposed stream banks.
- b) Apply appropriate erosion control (mulch, blankets, matting, etc).
- c) Install live willow stakes at specified locations.
- d) Supplement riparian zone with trees only after Busseron Creek has established good bank vegetation and is stabilized. Stream maintenance activities will damage riparian trees if planted early.

#### 9. Schedule:

Stream mitigation activities will begin with selective tree clearing upon permit issuance (dependent on the allowable Indiana bat tree-cutting window). Channel construction will follow during the next summer construction season. Following construction, the riparian buffer will be planted herbaceous cover species and supplemented with hard-mast bare root seedlings as needed, incorporating the species listed in the Bear Run Mine (Amendment 5) Section 404 permit application. Stream mitigation will be completed by the end of the 2<sup>nd</sup> full growing season after permit issuance.

#### References

Stantec, Mini-Regional Curve Development Southern Indiana, Peabody Energy Corporation Regional Curve Development, February 10, 2010.

## **Wetland Mitigation Plan**

### **Wetland Specifics:**

This plan proposes to create a total of 135.0 acres of PFO wetland at seven areas located adjacent to Busseron Creek. The current land use of these areas is agricultural, either pasture or row crop.

### **Mitigation Goals and Objectives:**

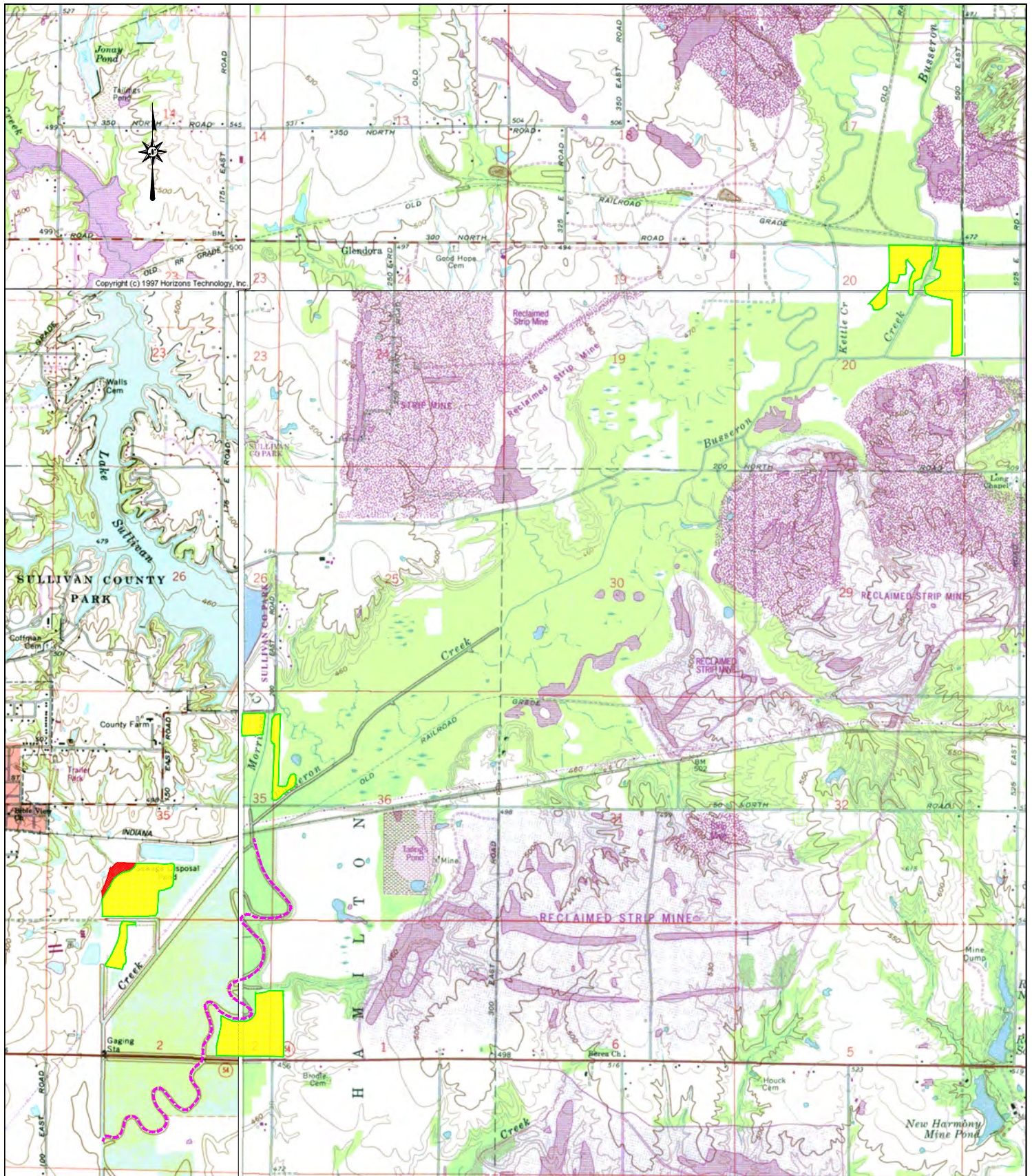
These wetland mitigation areas will be developed in the flood prone areas and overbank flooding will occupy the floodplain to service the adjacent wetlands. Overflow will be trapped and stored on the floodplain where it will undergo filtering via vegetation and sedimentation, and will then flow back into the stream to help drive more intermittent stream flow conditions. The ultimate goal of the project is to restore a self-sustaining riparian/wetland system that is well developed in target native vegetation so as to provide clean water and high quality habitat.

1. Site Selection and Justification: This site was chosen because it provides the largest contiguous ecological lift in the watershed compared to other potential sites.
2. Hydrology: The combination of the following two sources will provide frequency and duration optimal to support hydrology levels A, B, C, D, and E as defined by the Cowardin classification system. Plantings will be specific to this range of hydrology; with FAC+ species in the more temporarily flooded areas, OBL in the more seasonally flooded areas and FACW in the transitional areas. Overbank flooding from the restoration of Busseron Creek will occur on a frequency and distribution ideal for development of the PFO wetlands.

### **Schedule:**

Wetland mitigation will begin with selective tree clearing upon permit issuance (dependent on the allowable Indiana bat tree-cutting window). Wetland construction will follow during the next summer construction season. Following construction, the wetlands will be planted with hard-mast bare root seedlings at a rate of 250 stems per acre and incorporate the species listed in the Bear Run Mine (Amendment 5) Section 404 permit application. Wetland mitigation will be completed by the end of the second full growing season after permit issuance.





# LEGEND

- APPROXIMATE PROPOSED LOCATION OF RESTORED BUSSERON CREEK (~14,450 LINEAR FEET)
- APPROXIMATE LOCATION OF PFO WETLAND MITIGATION (~135 ACRES)
- APPROXIMATE LOCATION OF UPLAND FOREST MITIGATION (~4 ACRES)



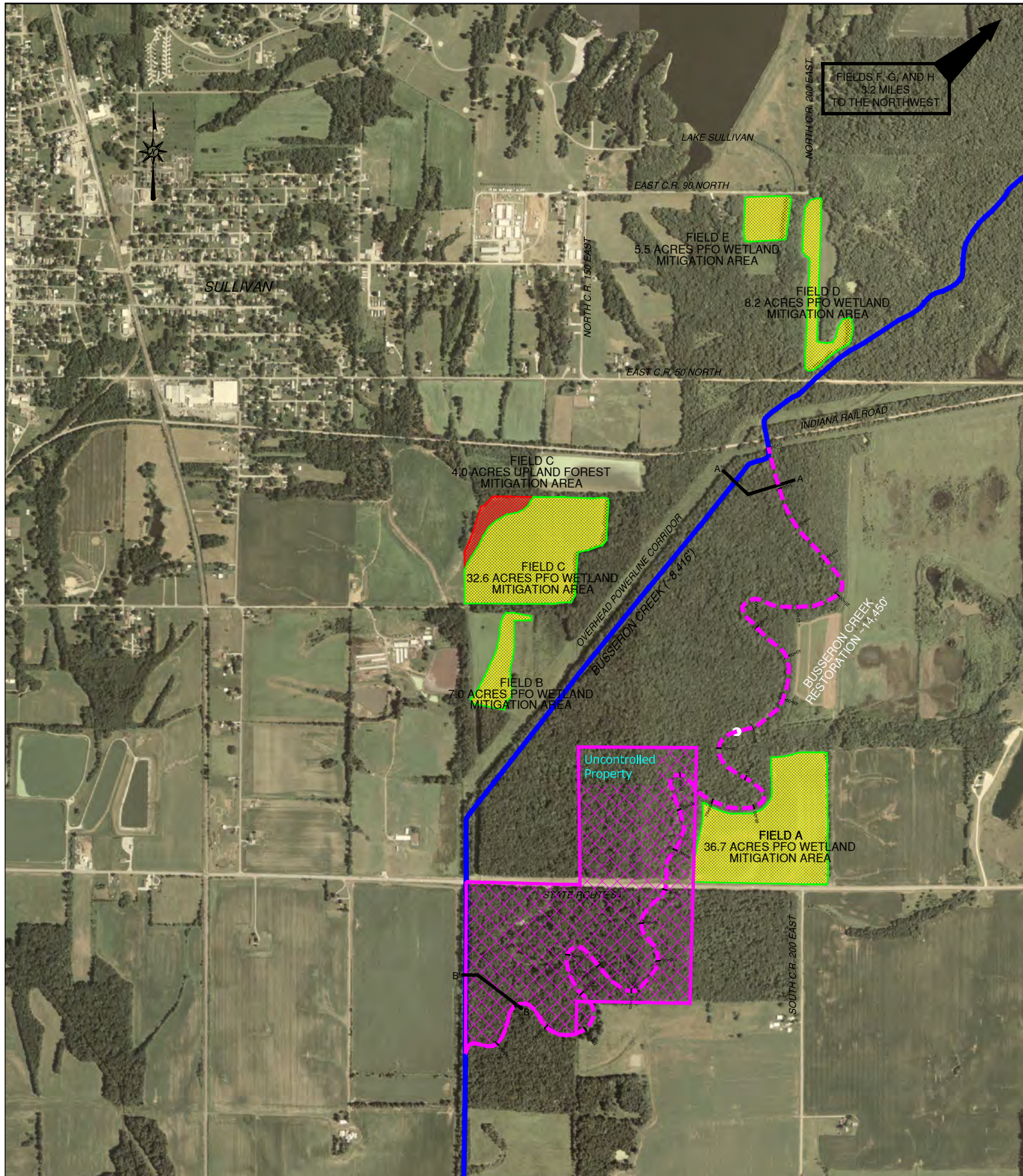
PEABODY MIDWEST MINING, LLC  
Evansville, Indiana

PERMIT NO.:	S-00256-5	MINE NAME:	BEAR RUN MINE (AMENDMENT 5)
SCALE:	1" = 3,000'	QUADRANGLE:	SULLIVAN, DUGGER, & HYMERA, INDIANA 7.5 MIN. QUADS
DRAWN BY:	RAW	DESCRIPTION:	SECTIONS 1 & 2 IN T8N, R9W; SECTIONS 35 & 36 IN T8N, R9W; SECTION 20 IN T8N, R9W IN SULLIVAN COUNTY, INDIANA
DATE:	JULY 26, 2012		

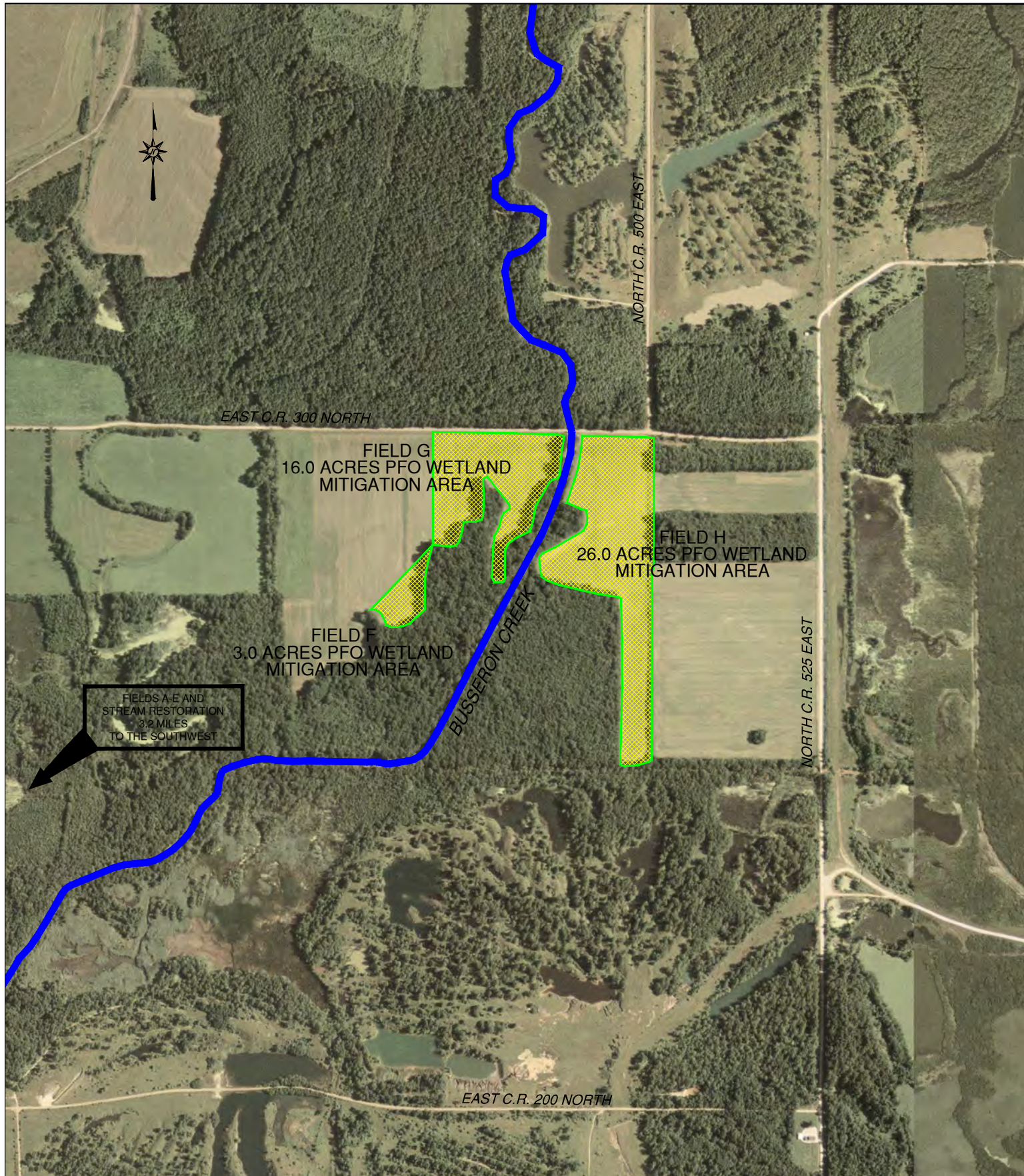
## BUSSERON CREEK STREAM AND WETLAND MITIGATION PLAN

GENERAL LOCATION MAP














#### LEGEND

-  DREDGED BUSSERON CREEK LOCATION (~8,416 LINEAR FEET)
-  APPROXIMATE PROPOSED LOCATION OF RESTORED BUSSERON CREEK (~14,450 LINEAR FEET)
-  APPROXIMATE LOCATION OF PFO WETLAND MITIGATION (~135 ACRES)
-  APPROXIMATE LOCATION OF UPLAND FOREST MITIGATION (~4 ACRES)
-  UNCONTROLLED PROPERTY



**PEABODY MIDWEST MINING, LLC**  
Evansville, Indiana

PERMIT NO.:	S-00256-5	MINE NAME:	BEAR RUN MINE (AMENDMENT 5)
SCALE:	1" = 1000'	QUADRANGLE:	SULLIVAN, DUGGER, & HYMERA, INDIANA 7.5 MIN QUADS
DRAWN BY:	RAW	DESCRIPTION:	SECTIONS 1 & 2 IN T7N, R9W; SECTIONS 35 & 36 IN T8N, R9W; SECTION 20 IN T8N, R8W IN SULLIVAN COUNTY, INDIANA
DATE:	JULY 26, 2012		

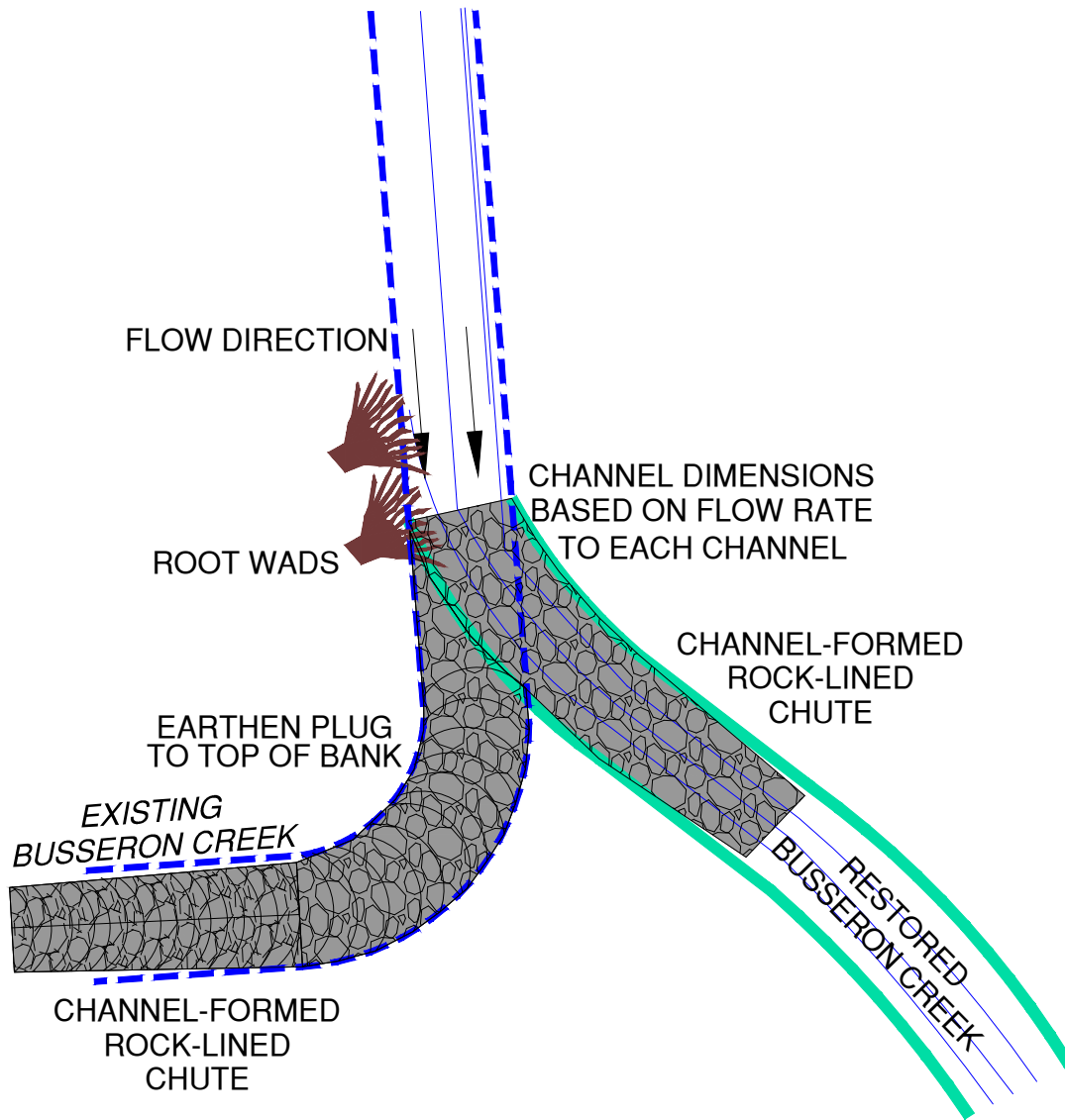
#### BUSSERON CREEK STREAM AND WETLAND MITIGATION PLAN

MITIGATION MAP



# BUSSERON CREEK PLUG DETAIL

PLAN VIEW



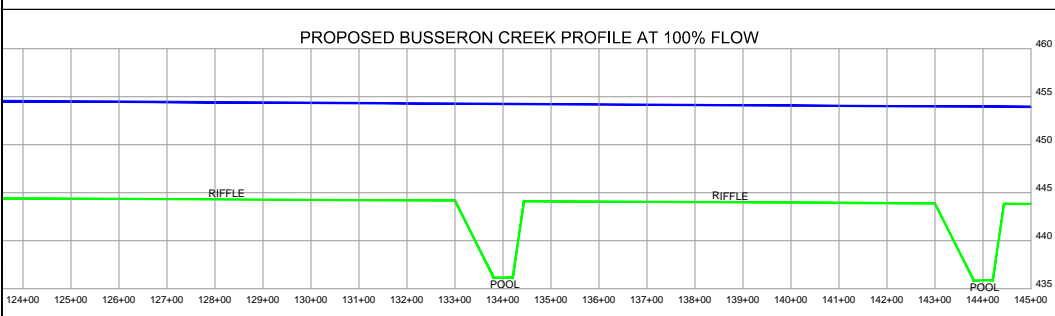
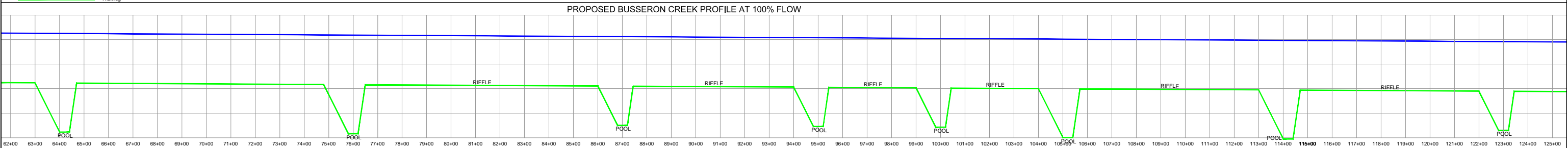
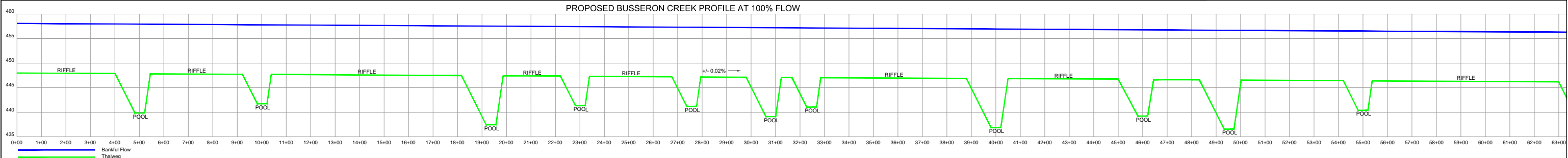
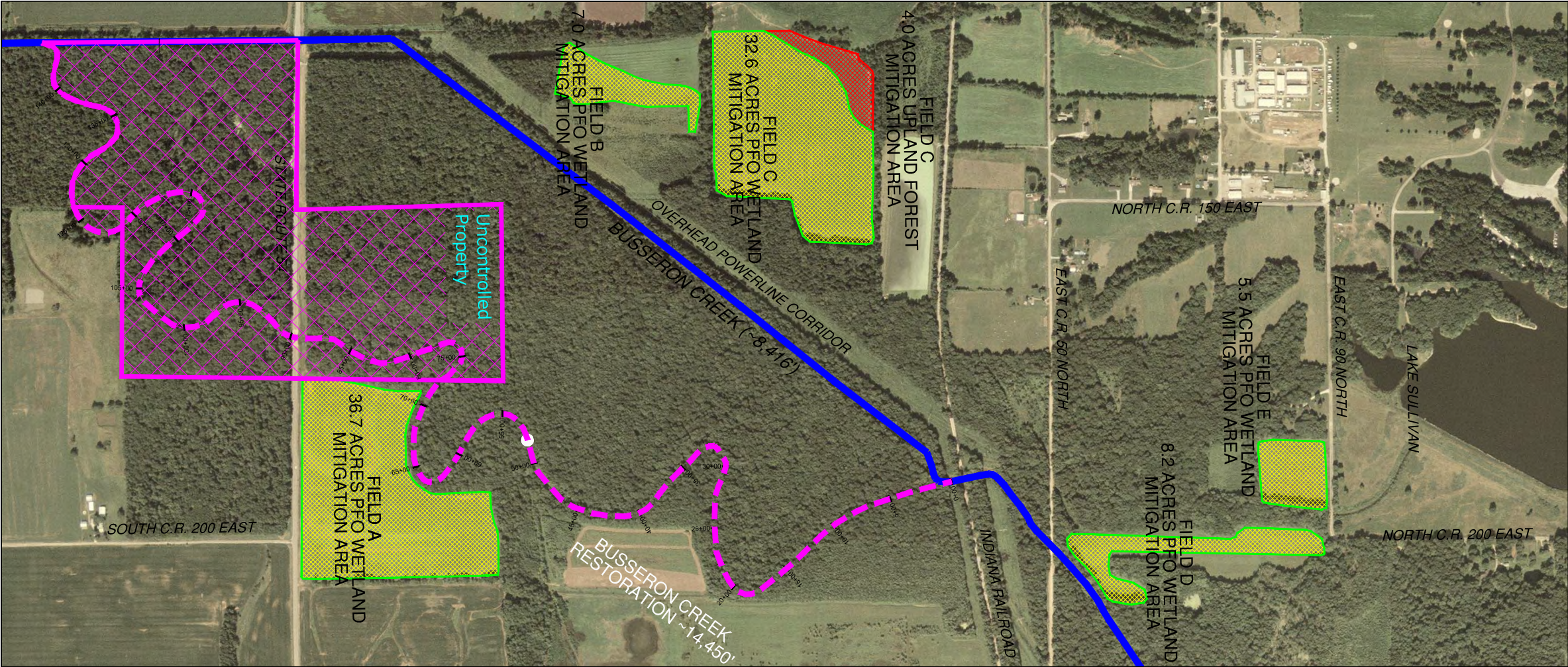
PEABODY MIDWEST MINING, LLC  
Evansville, Indiana

PERMIT NO.: S-00256-5	MINE NAME: BEAR RUN MINE (AMENDMENT 5)
SCALE: NOT TO SCALE	QUADRANGLE: SULLIVAN, DUGGER, & HYMERA, INDIANA 7.5 MIN QUADS
DRAWN BY: RAW	DESCRIPTION: SECTIONS 1 & 2 IN T7N, R9W; SECTIONS 35 & 36 IN T8N, R9W; SECTION 20 IN T8N, R8W IN SULLIVAN COUNTY, INDIANA
DATE: JULY 26, 2012	

BUSSERON CREEK STREAM AND WETLAND  
MITIGATION PLAN

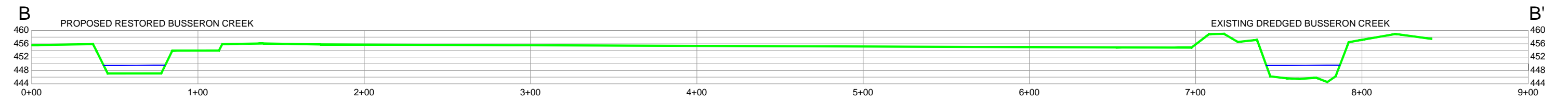
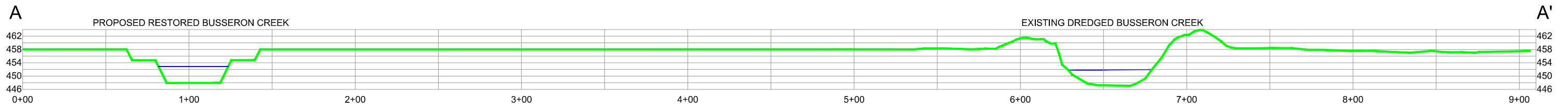
TYPICAL PLUG DETAIL





<b>Peabody</b>		<b>PEABODY MIDWEST MINING, LLC</b>	
Evansville, Indiana		Evansville, Indiana	
PERMIT NO.: S-00256-5	MINE NAME: BEAR RUN MINE (AMENDMENT 5)		
SCALE: 1" = 1000' Plan/400' Hor./20' Vert. Profile	QUADRANGLE: SULLIVAN, DUGGER, & HYMERA, INDIANA 7.5 MIN. QUADS		
DRAWN BY: RAW	DESCRIPTION: SECTIONS 1 & 2 IN T1N, R9W; SECTIONS 35 & 36 IN T8N, R9W; SECTION 20 IN T8N, R9W IN SULLIVAN COUNTY, INDIANA		
DATE: JULY 26, 2012			
<b>BUSSERON CREEK STREAM AND WETLAND MITIGATION PLAN</b>			
<b>PROPOSED PLAN AND PROFILE</b>			





<b>Peabody</b>		<b>PEABODY MIDWEST MINING, LLC</b>	
		Evansville , Indiana	
PERMIT NO.:	S-00256-5	MINE NAME:	BEAR RUN MINE (AMENDMENT 5)
SCALE:	AS SHOWN	QUADRANGLE:	SULLIVAN, DUGGER, & HYMERA, INDIANA 7.5 MIN QUADS
DRAWN BY:	RAW	DESCRIPTION:	SECTIONS 1 & 2 IN T7N, R9W; SECTIONS 35 & 36 IN T8N, R9W;
DATE:	JULY 26, 2012		SECTION 20 IN T8N, R9W IN SULLIVAN COUNTY, INDIANA
BUSSEON CREEK STREAM AND WETLAND MITIGATION PLAN			
SECTIONS A-A' AND B-B'			



